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Ruth Montalvo — 26 June 02 Date

Docket No.:GK-ZEI-3149/500343.20150

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Tobias KAUFHOLD, Johannes KNOBLICH and Matthias JOHN
Serial No.:	10/030,838
Filed:	January 10, 2002
For:	OPTICAL OBSERVATION APPARATUS PROVIDED WITH A SYSTEM DELIVERING INFORMATION VISUALLY PERCEPTIBLE IN THE OBSERVATION BEAM PATH

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to receipt of a first Office Action, please amend the above-identified application as follows:

IN THE SPECIFICATION

Cancel the present specification and substitute therefor the enclosed substitute specification.

IN THE CLAIMS

Page 6, line 1, change "Patent Claims" to –What is claimed is--.

Cancel claims 1-5 and add new claims 6-10, reading as follows:

--6. (New) An optical observation instrument comprising:

at least one eyepiece having an intermediate image plane; and

a device for displaying information relating to the adjusted instrument parameters, the current operating state and/or the object to be observed in a visually perceptible manner being arranged in said intermediate image plane.

7. (New) The optical observation instrument according to claim 6, wherein a self-illuminating LED display which is connected to control electronics or an LCD display with background illumination which is connected to control electronics is provided in the intermediate image plane of the eyepiece.

8. (New) The optical observation instrument according to claim 6, wherein the control electronics are integrated in the eyepiece tube and are connected by control lines and supply lines to a central operating device and supply device of the observation instrument.

9. (New) The optical observation instrument according to claim 6, wherein the information for the observer is perceptible in the eyepiece outside the image field area reserved for observation of the specimen.

10. (New) An eyepiece for optical observation instruments comprising:

a device arranged in an intermediate image plane of said eyepiece for displaying information in a visually perceptible manner;

said eyepiece being constructed with respect to shape, size and fastening means in a same manner which is the same as an eyepiece not having such a device, so that an eyepiece with or without such a device can be exchanged on optical observation instruments.--

IN THE ABSTRACT OF THE DISCLOSURE

Cancel the present Abstract of the Disclosure and substitute therefor the enclosed Abstract of the Disclosure which is attached to the Substitute Specification.

REMARKS

Claims 1-5 have been cancelled and new claims 6-10 have been added. The amendments to the claims have been made only to improve the form of the claims for examination purposes.

The specification and abstract have been amended to conform it to U.S. format.

An early and favorable action on the merits is respectfully requested.

Respectfully submitted,

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June 25, 2002
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Enc.: Substitute Specification
Substitute Abstract of the Disclosure
Marked-up / Bplded Versions

Customer No.	**026418**	
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE		
Attorney's Docket No.:	**GK-ZEI-3149 / 500343.20150**	
U.S. Application No.:	**10/030,838**	
International Application No.:	**PCT/EP01/05081**	
International Filing Date:	**MAY 05, 2001**	**05 MAY 2001**
Priority Date Claimed:	**MAY 18, 2000**	**18 MAY 2000**
Title of Invention:	**OPTICAL OBSERVATION APPARATUS PROVIDED WITH A SYSTEM DELIVERING INFORMATION VISUALLY PERCEPTIBLE IN THE OBSERVATION BEAM PATH)**	
Applicant(s) for (DO/EO/US):	**Tobias KAUFHOLD, Johannes KNOBLICH** and **Matthias JOHN**	

MARKED-UP / BOLDED

VERSIONS OF THE SUBSTITUTE SPECIFICATION.

AND

ABSTRACT

Docket No.: GK-ZEI-3149/500343.20150

OPTICAL OBSERVATION APPARATUS PROVIDED WITH A SYSTEM DELIVERING INFORMATION VISUALLY PERCEPTIBLE IN THE OBSERVATION BEAM PATH

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority of PCT Application Serial No. PCT/EP01/05081 filed May 5, 2001 and German Application No. 100 24 686.9 filed May 18, 2000, the complete disclosures of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

a) Field of the Invention

The invention is directed to an observation instrument provided with a device for introducing visually perceptible information which preferably relates to the adjusted instrument parameters, the current operating states and/or the object to be observed.

b) Description of the Related Art

The insertion of illuminated specimen data and reflection of other visually perceptible information into the beam path of optical observation instruments is known, above all, in microscopy, and plays an important part particularly in the production of microscope photographs. This is achieved, for example, in that nine-digit LED numbers are imaged in the film plane at the edge of the format.

In the arrangements that were previously developed for this purpose, the displayed information and data are reflected into the beam path at a suitable location by splitter mirrors or the like devices and made visible for the observer within the image field or, for a camera, within the film plane.

MARKED-UP / BOLDED SPECIFICATION AND ABSTRACT

In optical observation instruments, particularly microscopes, to which image processing systems are connected, the data and information are revealed in the monitor image by means of computer software.

In camcorders, for instance, added information is made visible in the eyepiece in that corresponding data are generated on an LCD matrix by software. This added information and the structure of a recorded image which is made visible on the LCD matrix are reflected into the observation beam path together and can be viewed by means of the eyepiece optics or a magnifier. In other words, the image information and the added information are reproduced by means of a common display element, the LCD matrix. In so doing, the image resolution is limited by the size of the individual LCD pixels.

OBJECT AND SUMMARY OF THE INVENTION

Proceeding from this prior art, it is the **primary** object of the invention to reflect data into the observation beam path of an optical observation instrument in a more economical manner.

To this end, at least one eyepiece is provided, according to the invention, in an optical observation instrument, and a device for displaying information in a visually perceptible manner is arranged in the intermediate image plane of the eyepiece. In this way, added information is effectively introduced into the observation beam path with low expenditure on instrumentation because, in contrast to the prior art, no splitter mirrors or the like optical components are required. Further, this prevents unnecessary attenuation of the intensity of the observed image due to additional splitter mirrors or the like.

The arrangement according to the invention results in the advantage that the observer can perceive additional information, e.g., about adjusted instrument parameters, about the operating state of the instrument and/or about the specimen, without having to interrupt observation through the eyepiece. Observation can be carried out without interrupting concentration.

MARKED-UP / BOLDED SPECIFICATION AND ABSTRACT

In preferred embodiments of the invention, a self-illuminating LED display on which information is generated and which is connected to control electronics or an LCD display with background illumination on which information is generated and which is connected to control electronics is arranged in the intermediate image plane of the eyepiece.

Further, in a particularly preferred construction, not only the LCD display or LED display, but also the control electronics are integrated in the eyepiece tube and are connected by control lines and supply lines to a central operating device and supply device of the instrument. This results in a further simplification and compactness of the construction.

Further, according to the invention, the display of information is carried out outside the image field area reserved for observation. In this way, a negative influence on the good optical image quality customarily achieved with eyepiece observation is prevented, i.e., image quality is maintained while providing additional information for the observer.

The invention is further directed to an eyepiece as an independent component for retrofitting optical instruments, particularly for microscopes, in which a device for visually perceptible display of information according to the preceding description is provided in the intermediate image plane, this eyepiece being constructed with respect to shape, size and fastening means in the same manner as eyepieces not having such a device.

In this way, an optical component is provided by which the described advantages can also be exploited for microscopes or other optical observation instruments by replacing the previously used eyepieces with the eyepiece according to the invention.

For this purpose, the eyepiece can be provided with fastening elements adapted to the holder of the previously used eyepiece in the respective optical instrument so as to facilitate exchange. The control and power supply can be carried out via a standardized interface, e.g., an RS232 interface, to a central operating and supply device of the optical instrument.

MARKED-UP / BOLDED SPECIFICATION AND ABSTRACT

In the following, the invention will be explained in more detail with reference to an embodiment example. **[In the accompanying drawing:]**

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 shows a schematic view of a microscope which is outfitted with the eyepiece according to the invention; **and**

Fig. 2 shows an example for the arrangement of an eight-digit display and another five LED points outside the image within the viewing field border of the intermediate image plane of an eyepiece.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows a microscope construction 1 with an eyepiece tube 2. An eyepiece 3 which is outfitted, according to the invention, with a device 4 for superimposing information in the microscope beam path, e.g., a controllable self-illuminating LED display, is inserted in the eyepiece tube 2.

The eyepiece constructed in this way is connected, via a control and supply line 5, to the central operating and supply device of the microscope (not shown in the drawing). The device 4 is coupled with control electronics which, like the device 4, can either be integrated in the eyepiece 3 or, alternatively, can be located in the operating and supply device of the microscope.

The device 4 is positioned in the intermediate image plane of the eyepiece 3 in such a way that the display of information is carried out outside the image field area reserved for observation in the microscope beam path.

In a particularly preferred manner, the device 4 is positioned in the intermediate image plane in such a way that observation in the eyepiece 3 results in a view shown in Fig. 2. In this case, a specimen section 6 can be seen in the center of the image field area of the microscope beam path 7 with the customarily good image quality of typical eyepiece observation. An eight-digit display device 8 and another display device comprising five LED points which is located diametrically across

from it are provided at the periphery. The display devices 8 and 9 are accordingly positioned outside of the intermediate image viewing field edge and do not negatively influence observation of the specimen section 6.

In particular, current parameter settings of the microscope such as magnification and working distance, measurement values such as focus position or intensity, operating states of the observation instrument such as switched on filter positions, switched on light sources, utilized optical beam path and the like can be displayed with the display devices 8 and 9.

While the foregoing description and drawings represent the present invention, it will be obvious to those skilled in the art that various changes may be made therein without departing from the true spirit and scope of the present invention.

MARKED-UP / BOLDED SPECIFICATION AND ABSTRACT

List of Reference Numbers

1	microscope construction
2	eyepiece tube
3	eyepiece
4	device
5	control and supply line
6	specimen section
7	microscope beam path
8	display device
9	display device

Abstract **of the Disclosure**

[According to the invention, a]An optical observation instrument, particularly a microscope, is outfitted with at least one eyepiece in which a device for displaying information in a visually perceptible manner is arranged in the intermediate image plane. In this way, added information is effectively introduced into the observation beam path with low expenditure on instrumentation because, in contrast to the prior art, no splitter mirrors or the like optical components are required. Further, this prevents unnecessary attenuation of the intensity of the observed image due to additional splitter mirrors or the like.

MARKED-UP / BOLDED SPECIFICATION AND ABSTRACT